

WHAT IS CLAIMED IS:

1. A method of managing recorded programs recorded in a recording medium in a broadcasting system comprising at least one transmitter and a plurality of terminals, wherein each transmitter broadcasts a data stream, a plurality of channels being multiplexed into each data stream, each channel comprising a plurality of programs and wherein each transmitter includes, in the data stream, program information comprising program information (PI) records associated with respective programs available in the broadcasting system, the method comprising the steps of:
  - each terminal
    - permitting a user to select a desired one of said programs;
    - adding said selected program to a recording queue which keeps program-identifying data sets in order of broadcast start time;
    - recording on said recording medium a program identified by one of said program-identifying data sets in a first position of said recording queue;
    - recording a program information record of said recorded program in a predetermined area on said recording medium;
    - in response to a reception of a playing request from the user, displaying a program guide for said recorded programs recorded on said recording medium;
    - prompting the user to select one of said recorded programs for play;
    - and
    - in response to the user selecting said one of said recorded programs, playing said selected recorded program to provide video and/or audio output(s).

2. A method as defined in claim 1, further including the step of said at

least one transmitter optionally including broadcast schedules for programs relating to each program in said program information, wherein if there are any broadcast schedules for related programs relating to said recorded programs, said program guide includes said any broadcast schedules, wherein  
5 said prompting step includes permitting the user to select one of said related programs, and wherein the method further includes the step of, in response to, the user selecting said one of said related programs, each terminal adding said selected related program to said recording queue.

10 3. A method as defined in claim 2, further including the step of said at least one transmitter optionally including a recommended program list relating to a program or a channel in said program information, wherein said displaying step includes displaying recommended program information relating to said recorded programs and to channels including said recorded  
15 programs, and wherein said permitting the user to select one of said related programs includes permitting the user to select one of said related programs and programs included in said recommended program information.

20 4. A method as defined in claim 1, wherein said step of permitting a user to select a desired one of said programs includes the step of permitting a user to select such a program as is to be broadcast concurrently with at least one program which is registered in said recording queue and which is included in a same data stream that includes such said program, wherein said recording step includes the steps of:

25 extracting such said program and said at least one program from said same data stream;

converting said such said program and said at least one program into

a time-division-multiplexed packet stream in a same form as said data stream; and

recording said time-division-multiplexed packet stream on said recording media.

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5. A method as defined in claim 1, wherein said step of permitting a user to select a desired one of said programs includes the step of permitting a user to select one of video channels and one of audio channels, said video and audio channels constituting said desired program, wherein said recording step  
10 includes the steps of:

extracting video data of said selected video channel and audio data of said selected audio channel from a data stream including said video and audio channels;

converting said video data and said audio data into a time-division-  
15 multiplexed packet stream in a same form as said data stream; and

recording said time-division-multiplexed packet stream on said recording media.

6. A method as defined in claim 5, further including the step of each  
20 transmitter including, in said PI record of each of programs that varies in its channel configuration in a middle of duration thereof, time periods for respective channel configurations of the program and a channel configuration for each of said time period, each channel configuration indicating said video and audio channels that constitute the program for a time period associated  
25 with said each channel configuration, wherein said step of permitting a user and said displaying step includes the step of displaying said time periods and corresponding channel configurations, and wherein said selecting one of video

channels and one of audio channels includes selecting, for each time period, a video and a audio channel from a channel configuration associated with the time period.

5           7. A method as defined in claim 2, wherein said including said broadcast schedules for related programs includes including only broadcast schedules for related programs that have not yet been broadcast.

8. A method as defined in claim 2, wherein if there are any broadcast  
10 schedules for related programs relating to said recorded programs, said program guide includes only broadcast schedules for related programs which relates to said recorded programs and which have not yet been broadcast.

9. A method as defined in claim 1, further including the steps of:  
15           said transmitter including, in said PI record of each of programs, a code indicative of whether the program is for rental and, if the program is for rental, a center telephone number;  
            the user selecting a recorded program with an indication of rental;  
            said terminal permitting the user to applying for a rent of said  
20 selected recorded program;  
            including a limit value determined by said application in said PI record of said selected recorded program; and  
            only if said limit value is not reached, permitting an executing of said playing step.

25           10. A method as defined in claim 9, further including the steps of:  
            said transmitter transmitting label information for use in printing a

label to be put on said recording medium; and

printing at least a part of said label information on a label.

11. A method as defined in claim 1, wherein said recording medium is  
5 a removable disc medium.

12. A method as defined in claim 1, wherein said recording medium is  
a removable tape medium, wherein said step of recording a program includes  
the step of recording said program and PI record associated with said program  
10 in time-division-multiplexing.

13. A method as defined in claim 12, wherein said step of recording  
said program and PI record including the steps of adjusting a recording  
frequency of said PI record according to a possible maximum recording rate  
15 minus a transmission rate required for said program.

14. A method as defined in claim 1, further including the steps of  
when a recording medium is recorded for the first time, recording a  
medium ID unique to said recording medium at a predetermined location in  
20 said predetermined area of said recording medium;

including, in said PI record of each of recorded programs of recording  
media that have been recorded by said terminal, said medium ID of a  
recording medium storing the recorded program;

including, in said PI record of each of recorded programs of recording  
25 media that have been recorded by said terminal, a recorded program ID  
unique to the recorded program;

storing, in a storage device, all of said PI records for said recorded

programs of recording media that have been recorded by said terminal, and  
permitting the user to retrieve a desired program.

15        15. A method as defined in claim 14, wherein said recording media is  
5        a removable disc medium, wherein the method further includes the steps of,  
each time of loading said disc media, updating relevant PI records stored in  
said storage device.

10        16. A method as defined in claim 1, wherein said recording medium is  
a removable tape medium and wherein the method further includes the steps  
of

when a recording medium is recorded for the first time, recording a  
medium ID unique to said recording medium at a predetermined location in  
said predetermined area of said recording medium;

15        including, in said PI record of each of recorded programs of recording  
media that have been recorded by said terminal, said medium ID of a  
recording medium storing the recorded program;

including, in said PI record of each of recorded programs of recording  
media that have been recorded by said terminal, a recorded program ID  
20        unique to the recorded program;

storing, in a storage device, all of said PI records for said recorded  
programs of recording media that have been recorded by said terminal, and

at a time of accessing a neighborhood of said predetermined area,  
copying said PI records of programs recorded on said recording medium which  
25        are stored in said storage device to said predetermined area of said recording  
medium, wherein said step of displaying a program guide uses said PI records  
stored in said storage device.

17. A method as defined in claim 16, wherein said step of recording a program includes the step of recording said program and said medium ID in time-division-multiplexing, said medium ID being recorded in a raised frequency, wherein the method further includes the step of, at a time of loading said medium, obtaining said medium ID by winding said tape in either direction; and wherein said step of displaying a program guide includes the step of reading said PI records stored in said storage device by using said obtained medium ID.

18. A multimedia terminal capable of managing recorded programs recorded in a recording medium in a broadcasting system comprising at least one transmitter and a plurality of terminals, wherein each transmitter broadcasts a data stream, a plurality of channels being multiplexed into each data stream, each channel comprising a plurality of programs and wherein each transmitter includes, in the data stream, program information comprising program information (PI) records associated with respective programs available in the broadcasting system, the multimedia terminal comprising:

means for permitting a user to select a desired one of said programs;  
means for adding said selected program to a recording queue which keeps program-identifying data sets in order of broadcast start time;

means for recording on said recording medium a program identified by one of said program-identifying data sets in a first position of said recording queue;

means for recording a program information record of said recorded program in a predetermined area on said recording medium;

means, responsive to a reception of a playing request from the user, for displaying a program guide for said recorded programs recorded on said recording medium;

means for prompting the user to select one of said recorded programs  
5 for play; and

means, response to the user selecting said one of said recorded programs, for playing said selected recorded program to provide video and/or audio output(s).

10 19. A multimedia terminal as defined in claim 18, wherein broadcast schedules for programs relating to each program are optionally included in said program information, wherein said means for displaying a program guide includes means, activated in the event there are any broadcast schedules for related programs relating to said recorded programs, for including said any  
15 broadcast schedules in said program guide, wherein said prompting means includes means for permitting the user to select one of said related programs, and wherein the multimedia terminal further includes means, responsive to the user selecting said one of said related programs, for adding said selected related program to said recording queue.

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20. A multimedia terminal as defined in claim 18, wherein said playing means includes:

means, responsive to a predetermined input by the user, for displaying a program information for said selected recorded program, said  
25 program information including information on related programs relating to said selected recorded program;

means for permitting the user to selecting one of said related



programs for recording; and

means, responsive to the user selecting said one of said related programs, for adding said selected related program to said recording queue.

5           21. A multimedia terminal as defined in claim 19, wherein said related programs are serialized programs.

22. A multimedia terminal as defined in claim 20, wherein said related programs are serialized programs.

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23. A multimedia terminal as defined in claim 19, wherein a recommended program list relating to a program or a channel is optionally included in said program information, wherein said means for displaying a program guide includes means for displaying recommended program  
15 information relating to said recorded programs and to channels including said recorded programs, and wherein said means for permitting the user to select one of said related programs includes means for permitting the user to select one of said related programs and programs included in said recommended program information.

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24. A multimedia terminal as defined in claim 18, wherein said means for permitting a user to select a desired one of said programs includes means for permitting a user to select such a program as is to be broadcast concurrently with at least one program which is registered in said recording  
25 queue and which is included in a same data stream that includes such said program, wherein said recording means includes:

means for extracting such said program and said at least one

program from said same data stream;

means for converting said such said program and said at least one program into a time-division-multiplexed packet stream in a same form as said data stream; and

5 means for recording said time-division-multiplexed packet stream on said recording media.

25. A multimedia terminal as defined in claim 18, wherein said means for permitting a user to select a desired one of said programs includes  
10 means for permitting a user to select one of video channels and one of audio channels, said video and audio channels constituting said desired program, wherein said recording means includes:

means for extracting video data of said selected video channel and audio data of said selected audio channel from a data stream including said  
15 video and audio channels;

means for converting said video data and said audio data into a time-division-multiplexed packet stream in a same form as said data stream; and

means for recording said time-division-multiplexed packet stream on said recording media.

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26. A multimedia terminal as defined in claim 25, wherein said PI record of each of programs that varies in its channel configuration in a middle of duration thereof includes time periods for respective channel configurations of the program and a channel configuration for each of said time period, each  
25 channel configuration indicating said video and audio channels that constitute the program for a time period associated with said each channel configuration, wherein said means for permitting a user and said displaying means includes

means for displaying said time periods and corresponding channel configurations, and wherein said means for permitting a user to select one of video channels and one of audio channels includes means for selecting, for each time period, a video and a audio channel from a channel configuration  
5 associated with the time period.

27. A multimedia terminal as defined in claim 19 wherein said broadcast schedules for related programs includes only broadcast schedules for related programs that have not yet been broadcast.

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28. A multimedia terminal as defined in claim 19, wherein said means for including said any broadcast schedules in said program guide includes means for including only broadcast schedules for related programs which relates to said recorded programs and which have not yet been  
15 broadcast.

29. A multimedia terminal as defined in claim 18, wherein said PI record of each of programs includes a code indicative of whether the program is for rental and, if the program is for rental, a center telephone number, and  
20 wherein the multimedia terminal further includes:

means for permitting the user to elect a recorded program with an indication of rental;

means for permitting the user to applying for a rent of said selected recorded program;

25 means for including a limit value determined by said application in said PI record of said selected recorded program; and

means, activated only in the event said limit value is not reached, for

permitting an executing of said playing step.

30. A multimedia terminal as defined in claim 29, further including:  
means for receiving, from said broadcasting transmitter, label  
5 information for use in printing a label to be put on said recording medium; and  
means for printing at least a part of said label information on a label.

31. A multimedia terminal as defined in claim 18, wherein said  
recording medium is a removable disc medium.

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32. A multimedia terminal as defined in claim 18, wherein said  
recording medium is a removable tape medium, wherein said means for  
recording a program includes means for recording said program and PI record  
associated with said program on said recording medium.

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33. A multimedia terminal as defined in claim 32, wherein said  
means for recording said program and PI record including means for adjusting  
a recording frequency of said PI record according to a possible maximum  
recording rate minus a transmission rate required for said program.

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34. A multimedia terminal as defined in claim 18, further including:  
means, activated when a recording medium is recorded for the first  
time, for recording a medium ID unique to said recording medium at a  
predetermined location in said predetermined area of said recording medium;

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means for including, in said PI record of each of recorded programs of  
recording media that have been recorded by said terminal, said medium ID of  
a recording medium storing the recorded program;

means for including, in said PI record of each of recorded programs of recording media that have been recorded by said terminal, a recorded program ID unique to the recorded program;

means for storing, in a storage device, all of said PI records for said  
5 recorded programs of recording media that have been recorded by said terminal, and

means for permitting the user to retrieve a desired program.

35. A multimedia terminal as defined in claim 34, wherein said  
10 recording media is a removable disc medium, wherein the multimedia terminal further includes means, activated each time of loading said disc media, for updating relevant PI records stored in said storage device.

36. A multimedia terminal as defined in claim 18, wherein said  
15 recording medium is a removable tape medium and wherein the multimedia terminal further includes:

means, activated when a recording medium is recorded for the first time, for recording a medium ID unique to said recording medium at a predetermined location in said predetermined area of said recording medium;

20 means for including, in said PI record of each of recorded programs of recording media that have been recorded by said terminal, said medium ID of a recording medium storing the recorded program;

means for including, in said PI record of each of recorded programs of recording media that have been recorded by said terminal, a recorded program  
25 ID unique to the recorded program;

means for storing, in a storage device, all of said PI records for said recorded programs of recording media that have been recorded by said

terminal, and

means, activated at a time of accessing a neighborhood of said predetermined area, for copying said PI records of programs recorded on said recording medium which are stored in said storage device to said

5 predetermined area of said recording medium, wherein said means for displaying a program guide uses said PI records stored in said storage device.

37. A multimedia terminal as defined in claim 36, wherein said means for recording a program includes means for recording said program and  
10 said medium ID in time-division-multiplexing, said medium ID being recorded in a raised frequency, wherein the multimedia terminal further includes means, activated at a time of loading said medium, for obtaining said medium ID by winding said tape in either direction; and wherein said means for displaying a program guide includes means for reading said PI records stored  
15 in said storage device by using said obtained medium ID.

38. A multimedia terminal as defined in claim 18, wherein said PI record of each of programs includes a code indicative of whether the program is for rental and, if the program is for rental, a center telephone number, and  
20 wherein the multimedia terminal further includes:

means for permitting the user to elect a recorded program with an indication of rental;

means for permitting the user to applying for a rent of said selected recorded program;

25 means, responsive to a request for playing one of rental programs, for referring to a rental center for a validity of said one of said rental program; and

means, activated only in the event said one of said rental program is valid, for enabling said playing means.

39. A multimedia reproducer for reproducing recorded programs  
5 recorded on a recording medium, wherein program information comprising program information (PI) records associated with said recorded programs is also recorded on the recording medium, the multimedia reproducer comprising:

means, responsive to a reception of a reproducing request from the  
10 user, for displaying a program guide for said recorded programs and prompting the user to select one of said recorded programs for play; and

means, response to the user selecting said one of said recorded programs, for reproducing said selected recorded program.

15 40. A multimedia reproducer as defined in claim 39, wherein said PI record of each of programs includes a code indicative of whether the program is for rental and, if the program is for rental, a center telephone number, and wherein the multimedia reproducer further includes:

means for permitting the user to elect a recorded program with an  
20 indication of rental;

means for permitting the user to applying for a rent of said selected recorded program;

means for including a limit value determined by said application in said PI record of said selected recorded program; and

25 means, activated only in the event said limit value is not reached, for enabling said playing means.

41. A multimedia terminal as defined in claim 40, further including:  
means for receiving, from external, label information for use in  
printing a label to be put on said recording medium; and  
means for printing at least a part of said label information on a label.